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May 17, 2016

Ms. Maryam Tasnif-Abassi
Department of Toxic Substances Control
5796 Corporate Avenue
Cypress, California 90630

SITE: FORMER AGRICULTURAL PARK
7020 CREST AVENUE
RIVERSIDE, CALIFORNIA

RE: AIR MONITORING PLAN ADDENDUM

Dear Ms. Tasnif-Abassi:

This document is intended to serve as an addendum to the *Workplan for Air Monitoring* provided as Appendix E in the Frey Environmental *Revised Response Plan – Excavation of Soils Containing PCBs* dated June 19, 2006. This addendum describes proposed methods to conduct upcoming air monitoring during soil removal efforts at the former Riverside Agricultural Park located at 7020 Crest Avenue in Riverside, California. Based on soil sampling efforts conducted in November 2015, as documented in the *Former Riverside Agricultural Park Soil Sampling Report* dated January 6, 2016, it was determined that surface soil with polychlorinated biphenyl (PCB) concentrations above the cleanup goal of 0.22 milligrams per kilogram (mg/kg) was present at select locations.

In 2009, Phase I of the remediation effort was conducted including excavation, removal, and proper disposal of soils containing PCB concentrations in excess of 50 mg/kg from locations determined by previous Site investigation efforts. In addition, soil samples were collected from select locations and analyzed for dioxins, furans and metals. All excavated soil with PCB concentrations at or above 50 mg/kg was transported offsite to the Waste Management, Incorporated, Kettleman Hills facility in Kettleman City, California. Soil containing PCB concentrations above 50 mg/kg at locations identified during previous Site characterization efforts has been removed, transported offsite, and disposed of properly. A total of ~8,666 tons of PCB- and /or metals-impacted soil were transported offsite for disposal. Additional items removed from the site include brush debris (green waste), PCB-contaminated concrete, sewer pipe, and utility poles.

In 2013/2014, Phase II of the removal effort was conducted including the excavation, removal, and disposal of soils containing PCB concentrations in excess of 0.22 mg/kg from locations determined by previous site investigation efforts. In addition, soil samples were collected from select locations and analyzed for dioxins, furans and metals. PCB-impacted soil (165,226.64 tons) generated during excavation activities was characterized as a non-hazardous waste and transported to the Waste Management, Inc. Azusa Land Reclamation facility in Azusa, California, for recycling. Additional materials that were removed from the Site included clean soil (30,782 tons), concrete (4,481.37 tons), green waste (422.26 tons), and asbestos-cement pipe (50.82 tons).

Phase III work activities began on March 22, 2016 following approval of the *Soil Sampling and Excavation Work Plan* (TRC, 2016) by DTSC and EPA and are ongoing. The work is being conducted based on four distinct types of areas or phases as described below:

- Cut Lots - lots where soil was removed to achieve the final grade in Tract 28987;
- Fill Lots - lots where soil was imported and compacted to achieve the final grade in Tract 28987;
- Outside Areas - areas outside of the planned Phase I housing development; and
- Final Lot Sampling - final confirmation soil sampling of all lots in Tract 28987 (first phase of housing development).

Please refer to the *Soil Sampling and Excavation Work Plan* (TRC, 2016) for details regarding the sampling and excavation efforts planned for each area.

Background

Construction activities, including excavation and soil loading, are capable of generating soil-derived dust. Suspension and dispersion of dust containing PCBs can be transported to nearby receptors where exposures may potentially occur. While the specific dust mitigation measures to be implemented during excavation and soil loading are intended to reduce the potential for dust generation, a program of measurement and verification is required to address the following objectives:

- Evaluate the influence of excavation activities on downwind dust concentrations,
- Identify the need for additional mitigation measures and/or work stoppage based on the dust levels observed, and
- Confirm that the concentrations of PCBs in air are below levels that are protective of public health.

Measurement of PCB concentrations in air requires the use of air sampling equipment and subsequent laboratory analysis. While air sampling approaches provide reliable measurements for presence of PCBs in air, the typical turnaround time for receipt of laboratory analytical data ranges from several days to weeks. Consequently, standard air sampling approaches may not identify an exceedance of a health-based concentration until days or weeks after the fact. In consideration of this limitation, the proposed air monitoring program is designed to provide both the efficacy of dust mitigation measures and to confirm that the work activities are performed in a manner that is protective of public health.

Real-time particulate monitoring provides more instantaneous feedback regarding the efficacy of the dust mitigation measures, but does not provide a direct measurement of the PCB concentration in air. Thus, the establishment of a health-based dust concentration limit (DCL) which is measureable by real-time air monitoring equipment is critical to preventing public exposures. The results of the particulate monitoring provide advance notice when dust levels at the project fenceline approach or exceed the DCL. This allows for prompt action to address and mitigate the condition such as increasing the frequency or volume of water applied to the work area or under extreme conditions, work stoppage. Development of a health-protective DCL is an essential element of the real-time particulate monitoring program. Additional details regarding the methodology utilized to establish a health-based DCL are provided in the following section.

Health-Based Dust Concentration Limit Determination

Derivation of the health-based DCL assumes that the concentration of PCBs in dust is proportional to PCB concentration detected in soil. The equation that describes the calculation of the health-based DCL is provided below:

$$DCL = REL_{PCB} / [C_{PCB} \; x \; CF]$$

Where:

DCL = Health-Based Dust Concentration Limit (μg/m^3)
REL_{PCB} = Health-Based Reference Exposure Level for PCBs in Air (μg/m^3)
C_{PCB} = Maximum Concentration of PCBs in Soil (mg/kg)
CF = Correction Factor (1E-6 kg soil/mg soil)

Based on the laboratory analytical results of soil samples collected at the Site, the maximum PCB concentration remaining is 500 mg/kg (Sample O2289-W25 at 0.5 fbg). In order to calculate the health-based DCL, a value representing the health-based reference exposure level for PCBs in air is required. Since the anticipated project duration is on the order of months as opposed to years, a chronic, non-cancer endpoint reference exposure level is a conservative and health-protective value to use for this analysis. The United States Environmental Protection Agency (USEPA) definition of a chronic exposure is one that occurs over a period of 7 years or longer. A summary of potentially applicable health-based reference exposure levels for PCBs in air in a residential setting is provided below:

Reference Exposure Level (μg/m^3)	Basis for REL Value	Source of REL
7.3E-2	Chronic, Non-Cancer Endpoint (Original Value from Frey, 2006)	EPA Preliminary Remediation Goals, unspeciated mixture of PCBs (USEPA, 2004)
8.0E-2	Chronic, Non-Cancer Endpoint	Human Health Risk Assessment Note 3 Table, DTSC-modified Screening Level Reference

Reference Exposure Level ($\mu g/m^3$)	Basis for REL Value	Source of REL
		Concentration for Aroclor 1254 (DTSC, 2016)
7.0E-2	Chronic, Non-Cancer Endpoint (route-to-route extrapolation from Oral Reference Dose [2E-5 mg/kg-day])	Integrated Risk Information System Oral Reference Dose for Aroclor 1254; extrapolated to Reference Concentration in air (USEPA, 2015)
1.2E-1	Sub-Chronic, Non-Cancer Endpoint (route-to-route extrapolation from Oral Minimum Risk Level [3E-5 mg/kg-day])	Intermediate (15 to 364 days) Oral Minimum Risk Level for PCBs (Aroclor 1254); extrapolated to Reference Concentration in air (ATSDR, 2000)

Notes:

DTSC, 2016. California Department of Toxic Substances Control. Human and Ecological Risk Office. Human Health Risk Assessment Note 3 Tables. Reference Concentration and Residential Air Screening Level for High Risk PCBs (e.g., Aroclor 1254).

USEPA, 2004. United States Environmental Protection Agency. Region 9 Preliminary Remediation Goal Table, Air-H20, Non-Cancer Endpoint for Unspeciated Mixture of PCBs, High Risk (e.g., Aroclor 1254). October.

USEPA, 2015. United States Environmental Protection Agency. Integrated Risk Information System. Reference Exposure Level Extrapolated from Oral Reference Dose for Aroclor 1254 of 2E-5 mg/kg-day based on body weight of 70 kg and 20 m^3/day inhalation rate for residential exposure.

ATSDR, 2000. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Polychlorinated Biphenyls (PCBs). November.

The potentially applicable reference exposure levels for intermediate to chronic, non-cancer effects range from 0.07 to 0.12 $\mu g/m^3$. These values are consistent with the reference exposure level utilized in the original dust action level calculation (Frey, 2006). For the purpose of calculating an updated DCL for Phase III remediation activities, the reference exposure level of 0.07 $\mu g/m^3$ was selected to derive the health-based DCL.

Table 1 provides an overview of the health-based DCL calculation and associated assumptions and references. Based on the current maximum PCB concentration detected in soil and the reference exposure level, the calculated health-based DCL for Phase III activities is approximately 140 $\mu g/m^3$. Dust levels below this value would not result in PCB concentrations in air above the reference exposure level of 0.07 $\mu g/m^3$. The calculated health-based DCL is considered very conservative as it was derived based on a chronic (7 years or longer) reference exposure level and the maximum PCB concentration detected in soil, even though the anticipated project duration is only several months and the average PCB concentration would have been a more realistic representation of PCB levels that could be carried by dust during the cleanup.

Since the health-based DCL is higher than the 50 $\mu g/m^3$ PM_{10} concentration limit described in SCAQMD Rule 403 (as the difference between upwind and downwind samples) for fugitive dust controls, this lower value will represent the dust action level for the Phase III activities.

Monitoring for dioxins/furans was contemplated in the 2006 Response Plan. However, at the established dust action level (50 µg/m3) for the Phase III cleanup, the maximum predicted concentration of dioxins in air using the maximum detected concentration in soil (4.5E-6 mg/kg after Phase II cleanup) would be 2E-13 mg/m^3 (see the equation above). This value is well below the Community Action Level of 7E-9 mg/m3, and thus dioxin/furan sampling is not needed.

It should be noted that upon completion of additional sampling that is currently underway, the health-based DCL calculation will be re-evaluated based on the maximum PCB concentration in soil. If the resulting health-based DCL is determined to be lower than 50 $\mu g/m^3$, the lower value will be used as the dust action level during Phase III activities.

Proposed Air Monitoring Activities to be Performed During Phase III

Air monitoring will be performed during earth moving activities during Phase III of the remedial effort. Air monitoring activities will include particulate monitoring for dust and monitoring for PCB concentrations in air.

Particulate Monitoring

Air monitoring for particulates (PM_{10}) will be conducted using Met One Instruments E-BAM portable beta attenuation monitors which are Federal Equivalent Method (FEM)-approved monitors. The monitors will be operated continuously during periods of soil disturbance on days where earth moving operations occur (maximum of 8 hours per day). One upwind monitor and two downwind monitors will be placed at the perimeter of the property to provide continuous monitoring of particulate matter. As previously described, the health-based DCL is approximately 140 $\mu g/m^3$. Since the SCAQMD Rule 403 PM_{10} concentration is lower than the health-based value, a value of 50 $\mu g/m^3$ is selected as the dust action level for Phase III activities. This action level is measured as the difference between the upwind and downwind monitors over a one-hour period. In the event that the difference between the upwind and downwind monitoring is greater than 50 $\mu g/m^3$, additional dust mitigation corrective measures will be implemented. Potential corrective measures to be considered range from increasing the water application rate and/or frequency, to the suspension of work activities.

It should be noted that the dust action level of 50 $\mu g/m^3$ is protective of public health with regard to potential exposures to PCBs in air during Phase III cleanup, as it is more stringent than the conservative health-based DCL of 140 $\mu g/m^3$ as discussed above. By way of comparison, the dust action level utilized during Phase I and Phase II activities was 7 $\mu g/m^3$ (Frey, 2006). The lower dust action level utilized during Phase I and II activities reflected the higher concentrations of PCBs in soil that existed at the time the Phase I work was performed. The higher dust action level for Phase III activities is reflective of the significant reduction in the maximum PCB concentrations in soil that were present during the Phase I and Phase II soil removal efforts conducted in 2009 and 2013/2014.

PCB Air Monitoring

Monitoring for PCBs in air will be performed in accordance with EPA Method TO-10A. Air pumps capable of moving 1 to 5 liters per minute (L/min) of air will be fitted with sorbent tube polyurethane foam (PUF) sampling devices. The pumps will be placed adjacent to each of the downwind E-BAM monitors and will be operated during earth moving activities (maximum of 8 hours per day). A minimum of two samples per day will be collected on days when earth moving activities are occurring. The samples will be sent to EMSL Analytical in Cinnaminson, New Jersey for laboratory analysis for PCBs. The results of the PCB monitoring will be compared to the intermediate to chronic PCB reference exposure levels of 0.07 to 0.12 $\mu g/m^3$ to confirm that concentrations of PCBs in air are below levels that are protective of public health.

In summary, this Air Monitoring Plan Addendum is intended to supplement the original Air Monitoring Plan that was used for Phase I and Phase II activities (Frey, 2006). In recognition that the current maximum concentration of PCBs in soil is at least an order of magnitude lower than the concentrations that were present prior to the completed removal activities, the health-based DCL was re-evaluated. The results of the analysis indicate that, based on the current maximum concentration of PCBs in soil, the health-based DCL is higher than the SCAQMD Rule 403 PM_{10} concentration (50 $\mu g/m^3$). Consequently, the dust action level to be utilized during Phase III activities is 50 $\mu g/m^3$.

Following completion of the additional soil sampling that is currently underway, the health-based DCL will be re-evaluated to consider the maximum PCB concentration in soil. The lower of the SCAQMD Rule 403 PM_{10} concentration (50 $\mu g/m^3$) or the health-based DCL will be used to evaluate the effectiveness of the dust mitigation measures and trigger implementation of additional dust mitigation corrective measures.

A minimum of two downwind air samples will be collected over a period of up to 8 hours during each day that excavation, loading or earth-moving activities occur. The results of the downwind air sampling will be compared to the intermediate to chronic PCB reference exposure levels of 0.07 to 0.12 $\mu g/m^3$ to confirm that concentrations of PCBs in air are below levels that are protective of public health. The air monitoring and sampling results will be reviewed on a daily basis to confirm the adequacy of the dust mitigation measures employed during Phase III activities.

If you have any comments, please contact David Lennon at (949) 341-7458.

Sincerely,

David Lennon
Principal Consultant

Ross Surrency, PG
Senior Project Geologist

Attachments:

Table 1 – Calculation of Health-Based Dust Concentration Limit (DCL) for PCBs

cc: Jason Low SCAQMD (electronic copy)
Katherine Baylor, EPA (electronic copy)
Greg Neal, DTSC (electronic copy)

Table 1
Calculation of Health-Based Dust Concentration Limit for PCBs
Phase III Air Monitoring Plan Addendum
Former Agricultural Park
Riverside, California

Equation

Health-Based Dust Concentration Limit = REL/ ($C_{soil\ max}$ x CF)

Symbol and Description	Units	Value
REL = Chronic, Non-Cancer Reference Concentration (EPA, 2015)	$\mu g/m^3$	0.07
$C_{PCB\ max}$ = Maximum Concentration of PCBs in soil[1]	mg/kg	500
$C_{PCB\ max}$ = Maximum Concentration of PCBs in soil[1]	$\mu g/kg$	500,000
CF = Correction factor	kg soil/mg soil	1.00E-06
Health-Based Dust Concentration Limit	mg dust/m^3 air	0.14
Health-Based Dust Concentration Limit	μg dust/m^3 air	140

Notes:
REL = Reference Exposure Level for PCBs in Air

EPA, 2015. Integrated Risk Information System. Reference Exposure Level Extrapolated from Chronic Oral Reference Dose for Aroclor 1254 of 2E-5 mg/kg-day based on body weight of 70 kg and 20 m^3/day inhalation rate for residential exposure.Levels for Residential Air.

[1] Maximum PCB concentration in soil (500 mg/kg) in Sample O2289-W25 at 0.5 fbg (4/25/16)

Health-Based Dust Concentration Limit represents the lowest concentration of dust in air that would not result in an exposure above the REL at the FRA Ag Park Fenceline.

$\mu g/kg$ = micrograms per kilogram
mg/kg = milligrams per kilogram
$\mu g/m^3$ = micrograms per cubic meter of air
mg/m^3 = milligrams per cubic meter of air